CHILLER SELECTION GUIDE

NORTH SLOPE CHILLERS

CHILLER SELECTION GUIDE

CONTENTS

INTRO TO CHILLERS

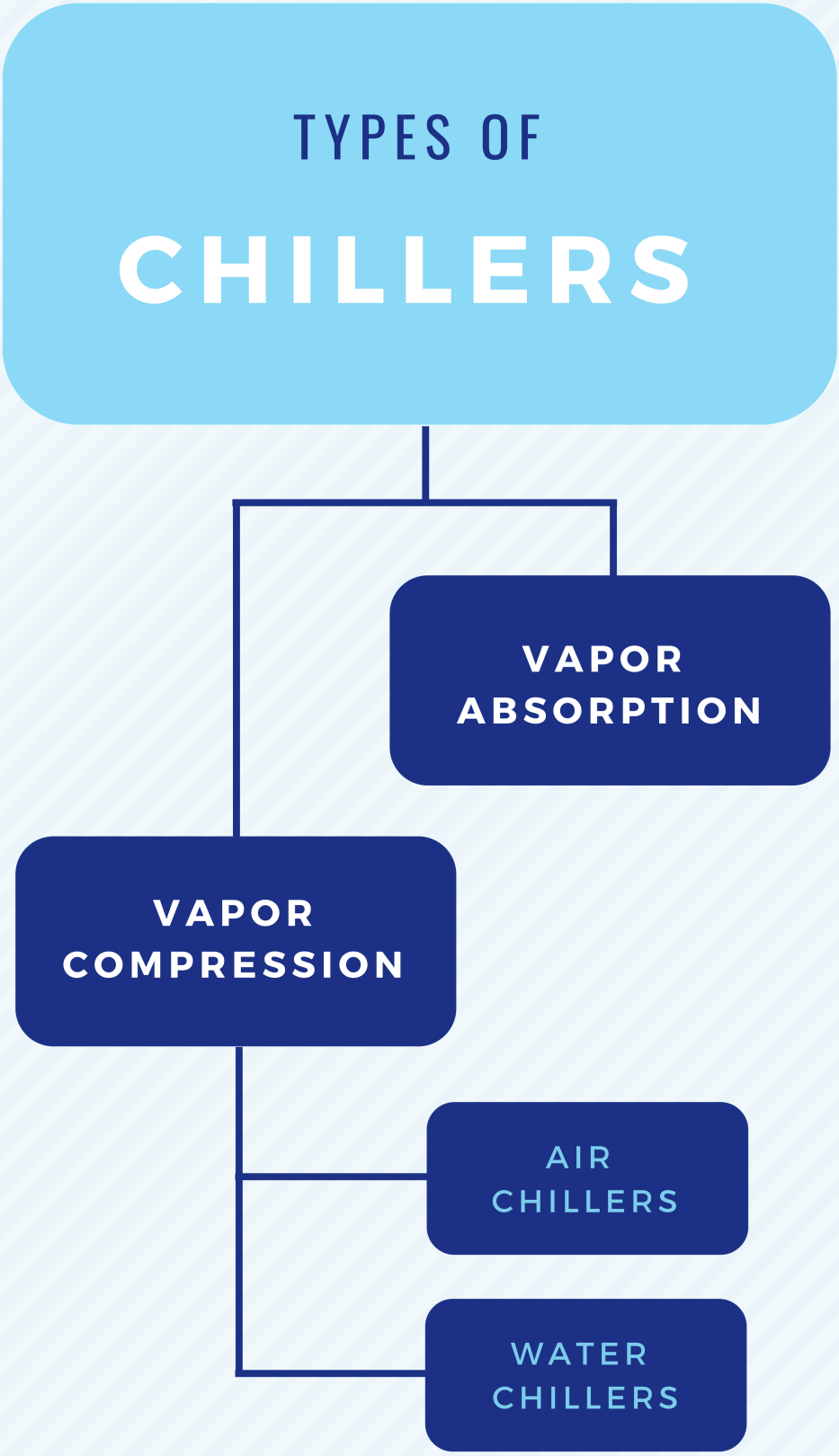
Industrial chillers are used to cool process fluids, typically water or a water/ glycol mix. These process fluids remove heat from machinery, equipment, foods, chemicals, etc. The fluid absorbs the heat from the external source and is then recirculated through the chiller to cool again and again. Chillers are used in many industries to cool down and, therefore, speed up production. Without them, there could be major issues such as damaged machines, poor product, and unwanted downtime.

Determining what kind of chiller you need can be daunting considering all of the different options. Picking the wrong chiller can lead to poor results and/or wasted energy and money.This guide will help assure that you have the necessary information to select the perfect chiller for your needs.

WHAT YOU'LL NEED TO KNOW:

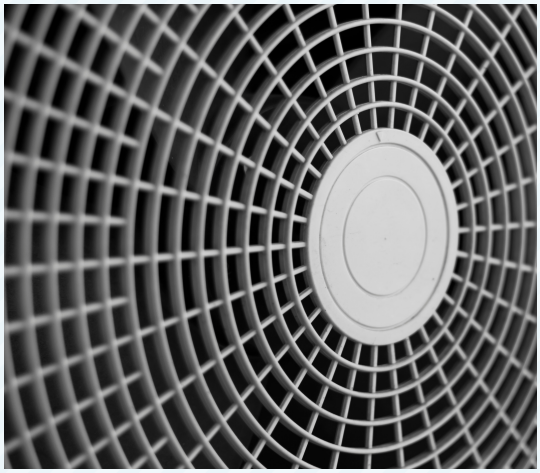
- Types of chillers available
- How to determine chiller size
- How a chiller works
- Chiller applications

TYPES OF CHILLERS



Chiller systems act as a refrigerator that aid in cooling residential and commercial spaces. They are commonly used to cool down machines, industrial operations, and industrial chemicals. Without these chiller systems, production can often be significantly slowed and objectives may not be achieved. When using a chiller system, energy, money and time are all efficiently saved.

There are two main categories that chillers fall under: **vapor compression** and **vapor absorption** chillers. The difference between the two is that vapor compression chillers use an electrically driven mechanical compressor to cool the system while absorption chillers use heat to move the refrigerant around the system. Vapor compression technology is most commonly used for air chillers and water chillers.



Air and water chillers are composed of the same main parts: an evaporator, a compressor, a condenser and an expansion valve. The mechanics are also very similar between the two. The major difference between air chillers and water chillers is how they extract unwanted heat. Air chillers use air to remove heat and water chillers use, you guessed it, water.

AIR CHILLERS

Fans are used in air chillers to force cool air across the condenser. Air chillers are beneficial because they are fairly easy to install and take up less space (these chillers are installed outside of the building/operation). Although air chillers require more energy to run than water-cooled chillers, they are a great option for stationary cooling.

WATER CHILLERS

Water-cooled chillers are often more efficient than air chillers because they pump water through a sealed condenser and disperse it through the cooling tower. Water has a high heat capacity which makes using water evaporation to dissipate heat extremely efficient and effective. Using this method instead of air cooling saves a significant amount of energy. Water chillers also tend to last longer than air-cooled chillers.

AIR CHILLERS

WATER CHILLERS

composed of:
an evaporator, a compressor,
a condenser, & an expansion valve

use fans to force cool air across the condenser

pump water through a sealed condenser and disperse it through the cooling tower

easy to install

more power efficient

take up less space

longer lasting

DETERMINING CHILLER SIZE

1 Calculate Temperature Differential (ΔT°F)

ΔT°F = Incoming Water Temperature (°F) - Required Chilled Water Temperature

Example: 85°F - 75°F = 10°F

2 Calculate BTU/hr

BTU/hr = Gallons per hr x 8.33 x ΔT°F

Example: (4gpm x 60) x 8.33 x 10°F = 19,992 BTU/hr

3 Calculate Tons of Cooling Capacity

Tons = BTU/hr ÷ 12,000

Example: 19,992 BTU/hr ÷ 12,000 = 1.666

4 Oversize the Chiller by 20% and Round Up

Ideal Size in Tons = Tons x 1.2

Example: 1.666 tons x 1.2 = 1.9992 tons ; a **2 ton chiller is needed**

We cannot overstate the importance of selecting a correctly sized chiller. By selecting the right sized chiller, you can be sure to avoid an undersized chiller that will not correctly chill your process equipment. Oversized chillers will work just fine, but why pay more than you need to? When you select a chiller of the proper size, you can rely on several years of efficient cooling. The illustrated formula can help you determine exactly what size of chiller will be most optimal to meet your needs.

Regardless of what you're cooling, this formula will determine your needed chiller size.

First, identify the following variables.:
-Incoming water temperature
-Required chilled water temperature
-Flow rate

To illustrate how this formula works, let's say we need to cool 4 GPM (gallons per minute) from 85 °F to 75 °F. This makes our incoming water temperature 85 °F, the required chilled water temperature 75 °F and the flow rate 4 GPM.

What chiller is right for you?

Not sure which chiller is best for your application? Our chiller selection tool can help you find exactly what you need. Simply fill in your cooling requirements, and we will identify the right chiller for you. If you have any questions or need additional help, call to talk to one of our cooling experts today! - **(866) 826-2993**

Find Your Chiller

Desired Fluid Out Temperature (°F)

Do you know the required capacity (BTU/HR)?

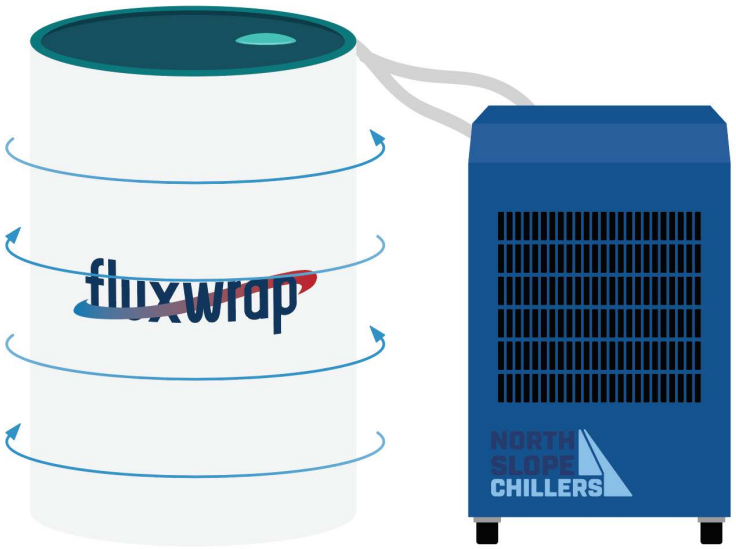
(•) Yes ( ) No

Required Capacity (BTU/HR)

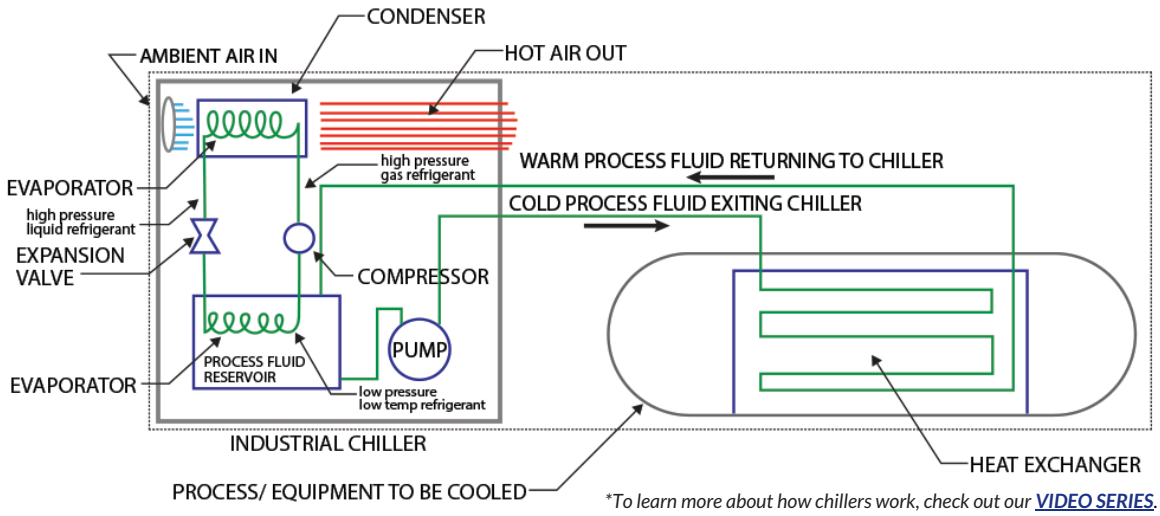
Approximate Fluid Return Temperature (°F)

Approximate Flow Rate (GPM)?

CALCULATE



HOW CHILLERS WORK



*To learn more about how chillers work, check out our VIDEO SERIES.

Industrial chillers cool process fluids. Process fluids (typically water or a water/glycol mix) are used to cool machinery, equipment, food, etc. The process fluid absorbs heat from what is being cooled. Then it goes through the chiller and the heat is removed from the process fluid and transferred to ambient air.

Chiller systems are made with two main circuits: **a refrigeration circuit** and a **fluid circuit**. The refrigeration circuit removes heat from the process fluid. It contains four components: the compressor, the condenser, the expansion valve and the evaporator. The fluid circuit is usually made of a process fluid reservoir, a pump, filters and a heat exchanger. All of which are necessary in order to carry the process fluid around the object being cooled.

To learn more about how chillers work, check out our VIDEO SERIES.

The refrigeration circuit is the most technical part of the chiller system. It uses the principles of thermodynamics to move heat from one place to another. In the case of chillers, heat is taken from the fluid being chilled and transferred to the ambient air.

COMPONENTS

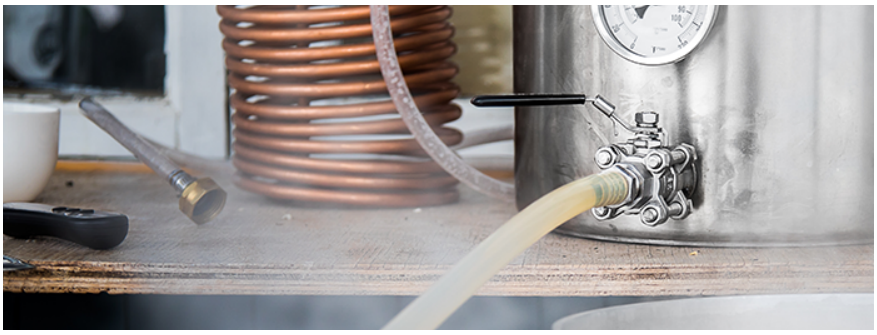
1. **The Compressor**: The refrigeration cycle begins with the compressor. The compressor transforms low-pressure low-temperature refrigerant in gas form into high-pressure high-temperature gas.
2. **The Condenser:** This gas flows through coils in the condenser. While in the condenser, air or water will flow over the coils and remove heat from the refrigerant. As the refrigerant cools down, it will begin to condense until all of the gas has condensed into a liquid.
3. **The Expansion Valve:** Next, the liquid leaves the condenser and goes through the expansion valve. The expansion valve redirects the flow of refrigerant. When the high-pressure liquid goes through the expansion valve, it enters the evaporator.
4. **The Evaporator**: The evaporator is where the refrigerant starts evaporating back into gas. Once the refrigerant evaporates, it gets very cold and absorbs a lot of heat. In the evaporator, the process fluid will interact with the cold refrigerant. Heat is removed from the fluid and transferred to the refrigerant. The refrigerant will then enter the compressor and the cycle begins again.

APPLICATIONS

Chillers are used in a variety of applications such as: process cooling, food and beverage, chemicals, plastics, printing, welding, laser, EDM, and more. They create several benefits from increasing operational efficiency, protecting critical materials and equipment, to maintaining essential temperatures, optimizing processes and saving time.

PROCESS COOLING

When systems begin producing high temperatures, it can be a big hassle to remove an entire system to solve the dilemma. When materials or systems overheat, you are risking damage to the materials and/or the equipment itself. Chillers are essential to keep your process cool and avoid these types of issues.



FOOD AND BEVERAGE

Heat is an important part of the fermentation process; however, if heat enters the process at the wrong time, or lasts for too long, undesired flavors and aromas develop. In addition, food, when exposed to warmer temperatures, immediately begins to age and spoil. Having a reliable cooling system to regulate the temperature of the food and beverages greatly extends the life and quality of both.

CHEMICALS

Chemical processing is one of the most demanding industries in the world. The level of exactness in the processing and handling of chemicals requires equipment that can be relied upon to meet extreme processing needs. One of the most challenging aspects of processing, handling, and storage of chemicals is the maintaining consistent temperatures. These operations require chillers that can always be relied on.

PLASTICS

When working in plastics, cooling effectiveness during extrusion and molding can be the difference between a commercially viable product and a misshaped pile of expensive spent polymers. Achieving a sufficiently cool temperature is only part of the process. The other part is to maintain near perfect temperature conditions.

PRINTING

The printing industry manufactures a wide variety of products from newspapers and magazines, to postcards and packaging goods. During the printing process, heat is generated due to friction within the system. In order to avoid damage or slowed production, temperature control is vital.

WELDING

When it comes to welding, keeping the equipment cool is essential to maintain the quality of welds and the project moving forward. Process cooling options vary based on they type of welder, or specific applications, but one of the more common solutions is industrial chillers.

EDM

EDM (electrical discharge machining), also known as spark machining, is a manufacturing process used to obtain a specific desired shape in metal by applying electrical discharges. Without proper cooling, the machinery can overheat and cause unwanted effects such as less specific cuts, a shorter life span and slower production speed.

THREE LEVELS OF CHILL TO MEET YOUR NEEDS

North Slope Chillers offers a line of lite-industrial compact chiller units ideal for entry-level applications, standard process cooling systems, and a line of chillers for intense chilling needs. Often, a cooling solution requires engineering expertise and custom attention. As a premier industrial chiller manufacturer, North Slope Chillers is happy to create the complete cooling solution to quickly meet your needs. If you find that you require something not found in our Frost, Freeze, and Deep Freeze chiller lines, North Slope can build custom solutions to fit your specific needs with the same quality as our standard units and in a timely manner. Your solutions are a simple phone call away.

FROST

This ***lite-industrial portable chiller*** is a fantastic entry-level unit if you are ready to test the waters with chilling.

- *Single container/application chilling*
- *Pumps Max flow rate is 18 LPM. fluid temperature range 45°F - 85°F*
- *Cool contents down to 55°F with ease*

FREEZE

Meet the dependable and powerful compact chiller. Freeze is North Slopes' standard industrial chiller. It's a lot of chilling power in a little package.

- *Cools fluids between 42°F-80°F*
- *Robust condensing unit*
- *Stainless steel reservoir*
- *High horsepower.*

DEEP FREEZE

Bring on Deep Freeze for ultimate industrial cooling. Intended to provide supreme industrial chilling, Deep Freeze shares many of the same hefty qualities of Freeze, PLUS . . .

- *The capacity to cool from 10°F to 60°F*
- *Fully insulated internal parts to ensure no internal temperature loss*

USING FLUXWRAP WITH NORTH SLOPE CHILLERS

IT'S SIMPLE

1. Wrap the jacket around your container and attach the flexible neoprene ends to secure the Fluxwrap.
2. Attach the hoses to the temperature control unit
3. Install the provided insulation to increase thermal control and reduce condensation.
4. Turn on the temperature control unit and begin regulating temperatures.

In addition to chillers, North Slope Chillers offers **Fluxwrap™**. Fluxwrap™ can chill materials in drums, totes, tanks and all manner of vessels, even when a heat exchanger is not currently present. The proprietary, multi-channel fluid path allows maximum flow of the cooling liquid with minimal pressure. The wrap conforms to the container shape and maintains thermal contact over uneven surfaces--creating full coverage cooling.